EL'PINER, I.Ye.

Mechanism of the action of ultrasonic waves on microorganisms.
Mikrobiologiia 24 no.3:371-381 My-Je '55. (MLRA 8:7)

1. Institut biologicheskoy fiziki Akademii nauk SSSR, Moskva.
(ULTRASONICS, effects,
on microorganisms)
(FUNGI, effect of radiations,
ultrasonics)
(BACTERIA, effect of radiations on,
ultrasonics)

EL'PINER, I. YE.

USSR/ Biology - Biochemistry

Card 1/1 Pub. 22 - 30/51

Authors : Deborin, G. A.; El'piner, I. Ye.; and Shibanova, O. M.

Title : Study of surface layers of egg albumin subjected to ultrasonic waves

Periodical : Dok. AN SSSR 101/2, 309-312, Mar 11, 1955

Abstract : Experimental data are presented showing that ultrasonic waves cause decomposition of albumin particles and the [illegible] of an albumin of [illegible] molecular weight. [illegible] molecules is discussed. Eleven references: [illegible]. Table; graphs.

Institution : Acad. of Sc. USSR, Inst. of Biophysics, and the A. N. Bakh Inst. of Biochemistry

Presented by: Academician A. I. Oparin, November 18, 1954

PEL'PINER, I. E.

Dependence of hydration of proteins on pH and temperature of the medium. A. G. Pasynskii and I. E. El'piner (A. N. Bakh Biochem. Inst., Acad. Sci. [illegible]). *Doklady Akad. Nauk* [illegible] 105 [illegible] *Khimid. Zhur.* 8 [illegible] 1946. Hydration [illegible] serum albumin, egg albumin, and gelatin was detd. by the method of compression as detd. by the rate of propagation of supersonic waves in the solns. (standing-wave method). For all 3 proteins hydration rises on both sides of the isoelec. point (shown graphically); in the pH interval of about [illegible] on both sides of the latter the hydration is substantially const. at about 0.3 g./g. for gelatin and serum albumin and 3.8 for egg albumin. The hydration curve of gelatin is steeper owing to its less-compact structure and more flexible configuration. In the pH range 4.4–9.8 human γ-globulin shows no significant change in hydration. Temp. dependence of hydration was detd. for horse hemoglobin and human serum albumin; 25–50° detns. show almost no change in degree of hydration. G. M. Kosolapoff

(1)

EL'PINER, I. Ye.

"On Biological Action of Ultrasound".
Abstracted for inclusion in the Second International Congress on Acoustics, Cambridge, Mass., 17-24, Jun 1956

Bioch. Inst. im. A. N. Bakh, (Signature Questionable) Dept. Of Chem. Sci., Academy of Scuences

EL'PINER, I.Ye.; DRIZE, I.M.

Reflection phenomena of ultrasonic waves in biological media.
Biofizika 1 no.1:30-35 '56. (MLRA 9:12)

1. Institut biologicheskoy fiziki Akademii nauk SSSR, Moskva.
(ULTRASONIC WAVES—PHYSIOLOGICAL EFFECT)

EL'PINER, I. YE.

J-4

USSR / Acoustics. Ultrasonics.

Abs Jour : Ref Zhur - Fizika No 3, 1957, No 7489

Author : Breslavets, L.P., El'piner, I.Ye.
Inst : Institute of Biophysics, Academy of Sciences, USSR, Moscow
Title : Action of Ultrasonic Waves on Vegetable Cells (Prothallus of Fern).

Orig Pub : Biofizika, 1956, 1, No 5, 448-451

Abstract : The prothallus of fern during the initial stage of the transition of the fibers shape into a planar one was exposed to sound at frequencies of 1200, 740 and 385 kc. At an intensity of 15 w/cm and a duration of exposure of 20 -- 40 minutes, damage to cells was observed. The cytological changes were observed at intensities of 2 -- 3 w/cm^2, and no frequency dependence was detected. The most sensitive of the organs of the cell were the chloroplasts. Five to ten minutes exposure led to a reduction in the size of the chloroplasts and to the disappearance of the starch grains from them. Increasing the exposure (10 -- 20 minutes) caused a reduction in both the dimansions as well as in

Card : 1/2

El'piner, I.Ye.

POLAND/Acoustics. J

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10192

Inst : Not given
Author : El'piner, I.E.
Title : Modern Status of the Problem of Biological Action of Ultrasonic Waves.

Orig Pub: Biofizika, 1956, 1, No 6, 513-524

Abstract: Survey article. Brief discussion of problems of the physical mechanism of the action of ultrasound on biological objects; the author dwells in somewhat greater detail on the results of biochemical and biological changes under the influence of ultrasound. In conclusion, the possibilities of measuring many parameters of biological objects by ultrasonic methods are considered.

Inst. Biol. Fiziki Akademii Nauk SSSR, Moskva

Card : 1/1

EL'PINER, I.YE.

USSR / Aqous tics. Ultrasound J-4

Abs Jour : Ref Zhur - Fizika, No 5, 1957, No 12754

Author : El'piner, I. Ye.

Inst : Not given

Title : Ultrasonic Location in Biology

Orig Pub : Priroda, 1956, No 10, 57-62

Abstract : Popular survey. It is noted that ultrasonic location has been successively applied to the solution of certain problems in medical diagnostics (location of stones in the liver and location of certain malignant tumors).

Card : 1/1

[redacted]

Country : USSR
Category: Human and Animal Physiology. Action of Physical
Factors. Ultrasonics.

F-5

USSR/Microbiology. Homoglobinophillic Bacteria

Abs Jour : Ref Zhur - Biol., No 14, 1958, No 62387

Author : Shoynkor A.P., El'pinor I.Yo.
Inst : AS USSR
Title : Immunizing Properties of Pathogenic Bacteria Subjected to the Action of Ultra-sound Waves (Portussis Bacillus).

Orig Pub : Dokl. AN SSSR, 1956, 111, No 2, 470-472

Abstract : It was shown that through the action of ultra-sound waves on pertussis bacilli, not only the toxins of the decomposed culture, which had passed into a physiological solution, but even the culture itself, possessed antigenic properties. The pertussis bacilli thereby lose their virulence, ortaining their immunogenic properties. The authors employed the culture, preserving it in a dry state. 15-20 ml of culture suspension (according to the enteric standard)

Card : 1/2

EL'PINER, Isaak Yefimovich, doktor biologicheskikh nauk; BENYUMOV, O.M., redaktor; GUBIN, M.I., tekhnicheskiy redaktor.

[Ultrasonic waves in biology] Ul'trazvukovye volny v biologii. Moskva, Izd-vo "Znanie," 1957. 31 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.8, no.7) (MLRA 10:4)

(ULTRASONIC WAVES--PHYSIOLOGICAL EFFECTS)

EL'PINER, I. Ye.

USSR/Physical Chemistry - Radiation Chemistry, Photochemistry, Theory of Photographic Process. B-10

Ab/ Jour: Referat. Zhurnal Khimiya, No 2, 1958, 3919.

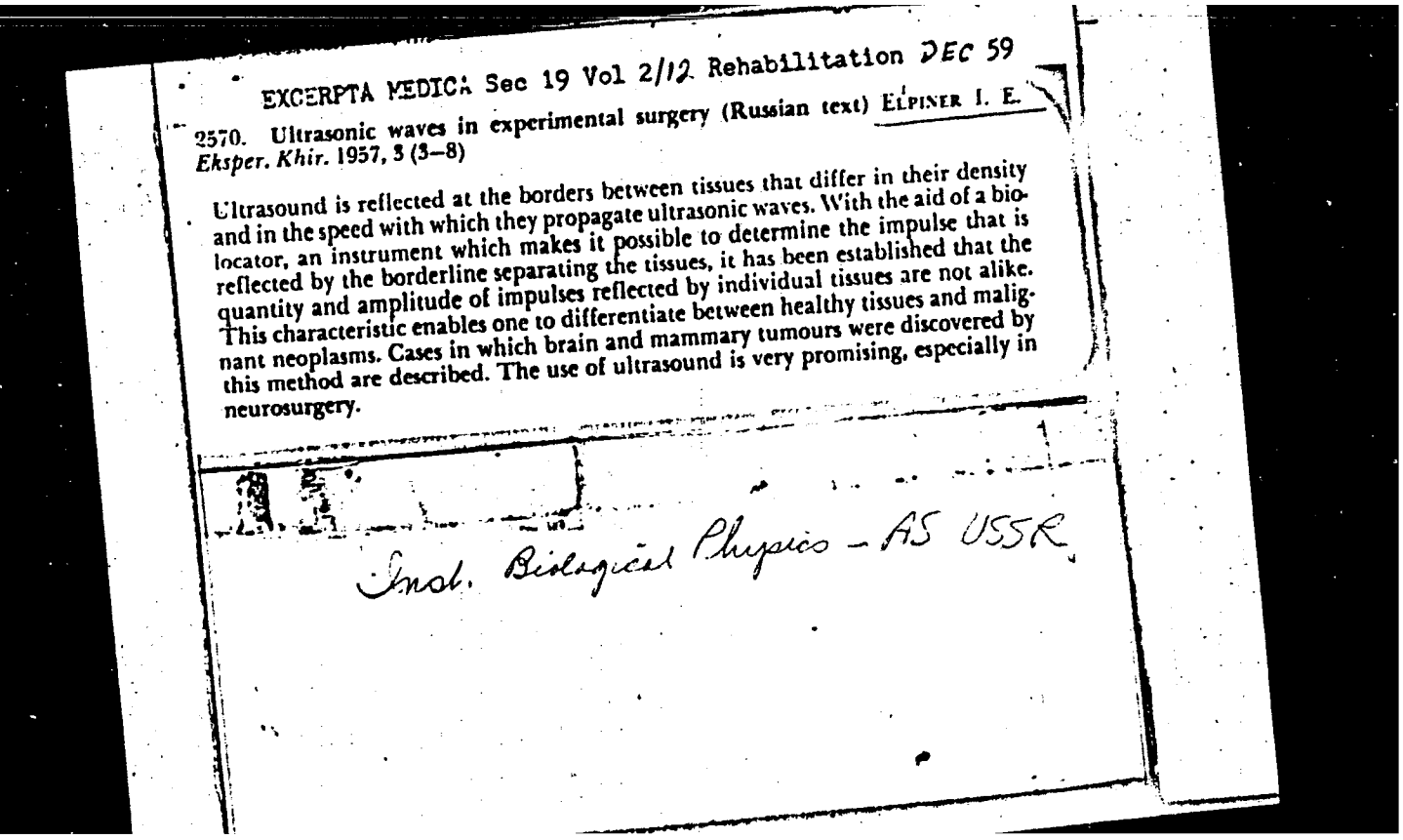
Author : I. Ye. El'piner, A.V. Sokol'skaya.
Inst :
Title : Ultrasonic Wave Action on Hydrocarbons.

Orig Pub: Biofizika, 1957, 2, No 2, 225-233.

Abstract: The ultrasonic action (frequency 385 kilocycles, intensity 4 to 5 watt per sq.cm) on aqueous solutions of mono-, di- and tri-saccharides: arabinose (I), glucose (II), saccharose (III), maltrose (IV) and raffinose (V) was studied. After ultrasonic treatment of alkaline solutions, the appearance of an absorption band of maximum 265 mμ was observed in the ultraviolet spectrum in every case. The same effect is observed at heating I, II and IV solutions, but not at heating III and V solutions. In all

-8-

Card : 1/2



EXCERPTA MEDICA Sec 19 Vol 2/12 Rehabilitation DEC 59

2570. Ultrasonic waves in experimental surgery (Russian text) ELPINER I. E. *Eksper. Khir.* 1957, 3 (3–8)

Ultrasound is reflected at the borders between tissues that differ in their density and in the speed with which they propagate ultrasonic waves. With the aid of a biolocator, an instrument which makes it possible to determine the impulse that is reflected by the borderline separating the tissues, it has been established that the quantity and amplitude of impulses reflected by individual tissues are not alike. This characteristic enables one to differentiate between healthy tissues and malignant neoplasms. Cases in which brain and mammary tumours were discovered by this method are described. The use of ultrasound is very promising, especially in neurosurgery.

Inst. Biological Physics – AS USSR

F

USSR/Microbiology. General Microbiology

Abst Jour : Ref Zhur-Biol., No 13, 1958, 57457

Author : Sheynker A. P., El'piner I.Ye

Inst : Not given

Title : Variability of Bacillus Pertusus Caused by Ultrasonic Waves

Orig Pub :: Biofizika, 1957, 2, No 3, 351-357

Abstract : A suspension of Bacilli pertusis in a physiological solution was sounded at frequency vibrations of 700 kilohertz and an intensity of 8 watt/cm^2. When seeded on a Borde-Zhangu medium immediately after the sounding, the bacteria developed in a normal manner. Morphological, toxic, and immunogenic changes in the properties of the pertusis bacillus were observed as a result of decomposition products when the

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F

USSR/Microbiology. General Microbiology

Abs Jour : Ref Zhur-Biol., No 13, 1958, 57457

Abstract : sounded suspension was preserved for periods from two to eight hours at a temperature of 4 degrees and then repeatedly sounded (5 to 6 times). The bacteria became coarser, and balllike projections appeared on one or both poles; the colonies became coarse, white in color, and dry. The virulence of the sounded culture sharply declined. The immunogenic properties of the sounded culture also weakened; however, the absence of toxic properties gave it a valuable advantage over the unsounded culture.

Card 2/2

El'piner, I. Ye.

46-3-14/15

AUTHORS: Sokol'skaya, A.V. and El'piner, I.Ye.

TITLE: On the Synthesis of Ammonia and Cyanic Compounds in an Ultrasonic Wave Field (O sinteze ammiaka i tsianistykh soyedineniy v pole ul'trazvukovykh voln)

PERIODICAL: Akusticheskiy Zhurnal, 1957, Vol.III, Nr 3, pp.293-294 (USSR)

ABSTRACT: It is known that oxidation of nitrogen takes place in an ultrasonic wave field. However, it has been shown that a reappearance of nitrogen will also take place under the action of ultrasonic waves. The reappearance of nitrogen in distilled water (formation of ammonia) irradiated with ultrasonic waves has been observed by the authors, using a preliminary saturation of the given liquid with nitrogen and hydrogen. The appearance of ammonia in the solution was established using a very sensitive Nessler's reagent. This reagent produces an orange colouring in the water when ammonia appears. A quantitative determination of ammonia was carried out by a colorimetric method (photoelectro-colorimeter-FEK-M). The distilled water and the gases which were used (nitrogen and hydrogen) were scrupulously

Card 1/3

46-3-14/15

On the Synthesis of Ammonia and Cyanic Compounds in an Ultrasonic Wave Field.

freed of oxygen. The irradiation was carried out at 380 kc/sec and 740 kc/sec, the intensity being 6-7 W/cm^2. The amount of ammonia synthesised in irradiated distilled water saturated with different gases is given in the following table:

Duration of irradiation in minutes	Amount of ammonia in $\gamma(10^{-6}$g) per millilitre of water irradiated in the presence of gases.			
	Hydrogen	Nitrogen	Hydrogen and Nitrogen	Air
50	-	-	0.85	-
60	0	0	1.25	-
120	-	0.62	2.6	-
180		-	8.7	0.62
360	-	-	12.5	-

Card 2/3 A graph is given of the amount of ammonia as a function of

On the Synthesis of Ammonia and Cyanic Compounds in an Ultrasonic Wave Field.

irradiation. This approximates to a straight line.
There is 1 table, 1 figure and no references.

ASSOCIATION: Institute of Biological Physics, Academy of Sciences, USSR, Moscow (Institut Biologicheskoy fiziki AN SSSR, Moskva)

SUBMITTED: March 22, 1957.

AVAILABLE: Library of Congress.

Card 3/3

USSR / General Biology. General Hydrobiology.

Abs Jour : Ref Zhur - Biol., No 12, 1958, No 52473 B-6

Author : El'piner, I. Ye.; Feygina, Z. S.
Inst : Not given
Title : Use of Ultrasound in Control of Hydrobionts.

Orig Pub : Vodosnabzheniye i san. tekhnika, 1957, No. 8, 14-16.

Abstract : The effect of ultrasound on various aquatic organisms causing damage to potable and industrial water supplies was studied under laboratory conditions. A piezo electric plate (50 mm diameter, 380 kc frequency, ultrasound intensity 5-6 v/cm^2, distance between emission source and object in a glass test tube 13-14 cm, water used as the liquid medium) was used as the emission source. Fresh water plankton (in the same quantity as the Dreissenidae-larvae) was completely destroyed at a 30-second exposure to ultrasound, oligochetes

Card 1/2

Abs Jour : Ref Zhur - Biol., No 12, 1958, No 52473

in 10 seconds, chironomides in 2 minutes, leeches in 2-3 minutes. Black Sea plankton was destroyed in 15 seconds, but Nauplius balpanus was very resistant and was destroyed only in water in direct contact with the emission source (lethal duration of the emission directly proportional to the thickness of the water layer; with an 0.4 - 0.5 cm layer, destruction commences in 30 seconds).

EL'PINER, I. Ye.

24-9-12/33

AUTHORS: Losev, B. I., Mel'nikova, A. N. and El'piner, I. Ye.(Moscow)

TITLE: Halogenation and extraction of germanium from coal inside an ultrasonic wave field. (Galoidirovaniye i izvlecheniye germaniya iz ugley v pole ul'trazvukovykh voln).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.9, pp. 90-95 (USSR)

ABSTRACT: Coal ash does contain a certain amount of germanium. In earlier work (Refs.1-4), the authors investigated the ash of clarain and vitrain and, particularly, of fusain. Since ultrasonics have dispersion and chemical effects, it was obvious to assume that it is possible to intensify by means of ultrasonics halogenation reactions which represent an important stage in the process of extraction of rare elements from the coal substance. In the experiments the coal was crushed to a fraction passing through a sieve with holes of 0.25 mm. The studied coal contained not over 0.0006% of germanium (relative to the ash content); only in a single specimen did the germanium content amount to 0.00175%. Bromination of the coal was effected in a three-neck flask containing an agitator. A certain quantity of water was added to the coal and the mixture was carefully intermixed. Following that, brome

Card 1/5

Halogenation and extraction of germanium from coal inside an ultrasonic wave field.

was introduced in drops and the bromination was continued for a specified time whilst continuously mixing the reaction mixture. Then, the coal was separated from the liquid phase in a Buchner funnel and washed from the adsorbed brome by distilled water until the washing water showed a negative reaction from the point of view of haloid content. Following that, the coal was dried at 80°C and analysed and the quantity of germanium in the filtrate was determined by means of a method developed by Nazarenko, V. A. and Ravitska, R.V. Chlorination was effected whilst feeding chlorine at a speed of two bubbles per second. For separating the germanium it is extracted from the analysed aqueous solutions in the form of germanium tetrachloride from 9-normal hydrochloric acid with carbon tetrachloride. The extract of germanium tetrachloride in carbon tetrachloride is effected by means of water which is then acidified and gelatine and phenyl fluoride are added. Ultrasonics of 380 and 750 kc/sec were supplied from a piezo-quartz plate of 50 mm dia. with a radiation intensity of 8W/cm^2 of the radiating surface. The distance between the reaction vessel and the piezo-quartz plate

Halogenation and extraction of germanium from coal inside an ultrasonic wave field.

equalled 15 to 16 cm. Halogenation inside an ultrasonic field was effected for coal of 0.25 to 0.10 mm fractions in an aqueous medium and the extraction of germanium by halogenation of coal was investigated inside an ultrasonic field as well as the extraction of germanium from coal under the effect of an ultrasonic field without halogenation. The results are plotted in graphs. An intensification was observed of the process of halogenation during irradiation with ultrasonics and this is primarily attributed to the fact that the presence in the aqueous solution of haloid is partly activated by the ultrasonics, which leads to the appearance of atomary chlorine or brome which is chemically more active than the molecular haloid. It is pointed out that activation of certain gases in the ultrasonics field is possible only in the presence of cavitation; speeding up of the halogenation process is in principle possible at such an intensity of the ultrasonics at which cavitation phenomena will inevitably occur; under certain conditions cavitation will set in approximately for a radiation intensity of 0.3 W/cm^2. In the here described experiments, the irradiation intensity was 8 W/cm^2, however, the irradiation was effected in glass vessels

Halogenation and extraction of germanium from coal inside an ultrasonic wave field.

which were submerged into an "ultrasonic" fountain and, according to Bergmann, the surface of glass reflects about 80% of the incident ultrasonic energy. Of particular interest is the fact of separation of germanium from the coal inside an ultrasonics field in absence of a haloid in the reaction mixture. The hypothesis is expressed that separation of germanium from coal is appreciably affected by mechanical forces which are linked with the appearance and collapse of cavitation bubbles which generate shock waves capable of breaking up the coal substance, provided that the cavitation cavity forms at a distance not exceeding a few microns.from the coal particle. The results throw a new light on the intensified separation of germanium during simultaneous irradiation and halogenation of coal in presence of slight quantities of carbon tetrachloride. The selection of this compound is not accidental since it is known that traces of carbon tetrachloride intensify oxidation processes inside an ultrasonics field, as a result of which atomary Cl splits off easily. Intensification of the chemical processes in presence of CCl_4 is additionally explained by the fact

AUTHOR ELPINER I.Ye., DVORKIN G.A.

TITLE The Effect Produced By Ultra-Sonic Waves Upon the Superficially Localized Adenosin-Polyphosphatase(Ecteapyrase)In Nukleated Red Blood Cells. 20-2-22/67
(Deystviye ul'trazvukovykh woln na poverkhnostno-lokalizi rovannuyu adenosinpoli fosfatazu (ekteapirazu)yadernykh eritrotsitov-Russian)

PERIODICAL Doklady Akademii Nauk SSSR,1957,Vol 113,Nr 2,pp 323-325 (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT Ultrasonic waves have an influence on the activity of enzymes,vitamines and other biocatalysts. As demonstrated in former reports, here not only an inactivation but sometimes on the contrary an increase of activity of these matters takes place. This was ascertained on the occasion of a direct sonic influence on tissues or cells with which the enzymes are connected. Ecteapyrase in its effect is directed on the substrate of the environment surrounding it ; it separates the phosphate from the following acids: adenosine triphospheric acid (ATP), adenosine diphospheric acid (ADP) and inosine triphosphoric acid (ITP). Separated hematocytes from heparinized pidgeon blood served as experimental substance. It was demonstrated that the erythrocytes of the pidgeon have a lower osmotic resistance than these of mammals (rabbit) and (rat). In the field of ultra-sonic waves this reistance diminishes even more.

Card 1/3 At the same time a stronger hemolytic effect of this sonic influence

The Effect Produced By Ultra-Sonic Waves Upon the [redacted]
Superficially Localized Adenosin-Polyphosphatase(Ecteapyrase)IN
Nukleated Red Blood Cells. 20-2-22/67

on the erythrocytes of pidgeons than in the case of the mentioned mammals was ascertained. Hemolysis occurs 15-20 seconds after the sonic influence. During this interval the activity of the ecteapyrase increases and after 5-7 seconds it attains its maximum, falling a little under the activity of intact cells after 15 seconds. This is probably due to hemolysis. No enzyme-activity was observed in the surrounding isotonic solution. Moreover it was tried to determine the part played by the sulfhydryl groups. So it turned out that the chloric cadmium ($1e^{-5}M$), which blocks up this group, considerably diminishes the activity of the ecteapyrase. Enzyme-activity is re-established by adding $1e^{-3}M$ cysteine. According to the results obtained by the authors it can be suspected that under the influence of ultrasonic waves new enzyme-active centres are "laid bare", most of which are also sensitive to thioltoxins. When analysing the increase of activity of the ecteapyrase, it is necessary to take the powers into consideration which are caused by the diffusion process of the ultrasonic waves. Dislocation and acceleration of the particles,development of frictional forces between micro-and macromolecules etc. are discussed. The authors observed the increase of activity in enzymes on the cellular membrane of yeast cells already before. This offers new prospects in the theory of the mechanism of action of ultrasonic

Card 2/3

The Effect Produced By Ultra-Sonic Waves Upon the [illegible]
Superficially Localized Adenosin-Polyphosphatase (Ecteapyrase)In
Nukleated Red Bleed Cells. 20-2-22/67

waves, in which the problems of their influence on the permeability of the cellular membrane play an important part. This permeability, as known, is controlled by the superficially localized enzyme-systems.
(With 2 schedules, 7 citations from publications).

ASSOCIATION Institute for Biological Physics of the Academy of Science of the
PRESENTED BY OPARIN A.I., Member of the Academy U.S.S.R.
SUBMITTED 22.11.1956
AVAILABLE Library of Congress
Card 3/3

EL'PINER, I. Ye.

20-2-38/60

AUTHORS: Losev, B. I., El'piner, I. Ye., Mel'nikova, A. N.

TITLE: On the Halogenation of Coals Under Influence of Ultrasonic Waves (O protsesse galoidirovaniya ugley pod deystviyem ul'trazvukovykh voln)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 2, pp.372-374 (USSR)

ABSTRACT: By extraction of rare metals from coals the problems of halogenation of coals have become acute, because this is the main method applied for this purpose. However, exact data as to the mechanism of halogenation are lacking, and the present methods are not characterized by a high yield. The process of halogenation is heterogeneous. It takes place at the boundary of two phases : Solid coal - liquid or gaseous halide. Naturally, for this purpose the solid phase with larger surface and higher dispersion would offer greater advantages. In addition, increase in the chemical activity of the reacting halide should accelerate the speed of the reaction. These requirements are largely satisfied by a new method

Card 1/4

On the Halogenation of Coals Under Influence of Ultrasonic Waves

devised by the authors of the paper under review, namely the use of ultrasonic waves which increase by several times the original amount the reaction yield and the combination reaction of coal with halides. The bromination takes place under relatively mild conditions of acceleration, i.e. under a relatively low intensity of the ultrasonic waves. These waves also accelerate a reaction with chlorine. A piezo-quartzgenerator was used. The quantity of bromine absorbed by the coal was determined with the aid of a micromethod, devised in the Institute of the authors of the present paper (see under "A" below). It can be seen from the results that without being exposed to ultrasonic waves the coal absorbed 2.68 % of its dry weight of bromine during the interval of seven minutes, whereas in the ultrasonic wave field, with the time interval remaining the same, this amount increased to 47.3 %. These data are contained in Table Nr 1 of the paper under review. The latter value (47.3 % in the ultrasonic wave field) corresponds to twenty hours of bromination at 0° without exposure to ultrasonic waves ; in other words: the process of bromination is accelerated to 160 times of its original efficiency. A chlorination (Table Nr 2 of the

On the Halogenation of Coals Under Influence of Ultrasonic Waves

paper under review) the process of absorption is accelerated almost two- and-a-half times. Rough interpretation of this acceleration: the ultrasonic waves have a dispersing effect, probably as result of mechanic forces that are created at opening and closing of cavitation bubbles. It appears that considerably mechanic forces also are produced when the pulsating frequency of the same gas bubbles coincides with the frequency of the ultrasonic oscillations (resonance phenomenon). Another possibility is the appearance of the activated halide as result of the molecular dissociation in the cavitation cavities, a phenomenon discovered for iodine (with subsequent reduction) as early as 1950. It should also be taken into account that in the cavitation cavities there appear, as result of the splitting of the "activated" water molecules, products with oxidizing effects. There are 2 tables, and 4 references, 3 of which are Soviet.

Inst. Mineral Fuels, AS USSR

EL'PINER, I.Ye.; SOKOL'SKAYA, A.V.

Effect of ultrasonic waves on aliphatic amino acids [with summary in English]. Biofizika 3 no.2:190-196 '58. (MIRA 11:4)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(ULTRASONIC WAVES--PHYSIOLOGICAL EFFECT) (AMINO ACIDS)

EL'PINER, I.Ye.; DVORKIN, G.A.

Effect of ultrasonic waves on the electrokinetic potential of cells [with summary in English]. Biofizika 3 no.6:641-647 '58. (MIRA 12:1)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(ULTRASONICS, eff.
on erythrocyte electrokinetic potential (Rus))
(ERYTHROCYTES, eff. of radiations,
ultrasonics, on electrokinetic potential (Rus))

SOV-46-4-3-14/18

AUTHORS: Sokol'skaya, A. V. and El'piner, I. Ye.

TITLE: Synthesis of Some Organic Compounds in an Ultrasonic Field (O sinteze nekotorykh organicheskikh soyedineniy v pole ul'trazvukovykh voln)

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol 4, Nr 3, pp 288-289 (USSR)

ABSTRACT: In the previous note (Ref.1) it was shown that under the action of ultrasonic waves ammonia, prussic acid, and formaldehyde may be synthesised in water in the presence of nitrogen, hydrogen, and carbon monoxide. It was then suggested that the dissociation and ionisation of gases and molecules of the solvent takes place directly in the cavitation bubbles. There are reasons to believe that some organic compounds are activated in cavitation bubbles. As an example the authors quote chemical transformations of CH_2Cl_2 in an ultrasonic wave field. It was found that this substance gives a new compound in the presence of oxygen, which is not soluble in the given medium and is precipitated out. The substance was found to be $C_{10}H_7O_3Cl_2$. An infrared analysis of this substance gave the curve shown in Fig.1. Thus chemical processes

Synthesis of Some Organic Compounds in an Ultrasonic Field

taking place in cavitation bubbles may lead to the synthesis of a number of new substances. R. Kh. Freydlinaya and V. I. Mal'shev are thanked for their assistance. There are 2 figures and 2 references, 1 of which is Soviet.

ASSOCIATION: Institut biologicheskoy fiziki, AN SSSR, Moskva (Institute of Biological Physics, Academy of Sciences USSR, Moscow)

SUBMITTED: March 25, 1958.

1. Organic compounds--Synthesis 2. Chemical reactions--Acoustic factors
3. Bubbles--Applications 4. Cavitation--Applications

Card 2/2

SOV-26-58-11-4/49

AUTHOR: El'piner, I.Ye., Doctor of Biological Sciences

TITLE: Ultrasonic Waves in Chemistry and Biochemistry (Ul'trazvukovyye volny v khimii i biokhimii)

PERIODICAL: Priroda, 1958, Nr 11, pp 23 - 30 (USSR)

ABSTRACT: The article deals with problems of the use of ultrasonic waves in contemporary chemistry and biochemistry. Application of these waves in chemical processes influences the direction and character of the chemical transformations, which may render the reaction products more valuable for practical use. A study of their influence on the bio-chemistry and development of animal and plant cells is also very promising; this includes spontaneous chemical changes of natural substances brought about by the waves. There are 5 graphs, 2 diagrams, 2 tables, and 9 references, 2 of which are German, 3 English, and 4 Soviet.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR /Moskva (Institute of Biological Physics of the AS USSR /Moscow)

1. Ultrasonic radiation--Applications

Card 1/1

AUTHORS: El'piner, I. Ye., Sokol'skaya, A. V. 2o-119-6-36/56

TITLE: On the Synthesis of Substances in a Water Saturated With Gases of a Reduction Atmosphere Under the Action of Supersonic Waves (O sinteze veshchestv v nasyshchennoy gazami vosstanovitel'noy atmosfery vode pod deystviyem ul'trazvukovykh voln)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 119, Nr 6, pp. 1180 - 1182 (USSR)

ABSTRACT: The data given in this work show the following: The propagation of very intensive supersonic waves in water causes also in the case of the absence of oxygen chemical processes in which various new substances form. In a water saturated with gaseous hydrogen and molecular iodine a dissociation of iodine takes place under the action of supersonic waves. This process takes place obviously in a cavitation cavity where the iodine molecules diffuse together with the molecular hydrogen. The ionisation (or dissociation) of iodine is closely connected with the parallel ionisation (or dissociation) of hydrogen. In the last time the authors were able to show that also other gases are activated under the action of supersonic waves, e.g. in the case of the

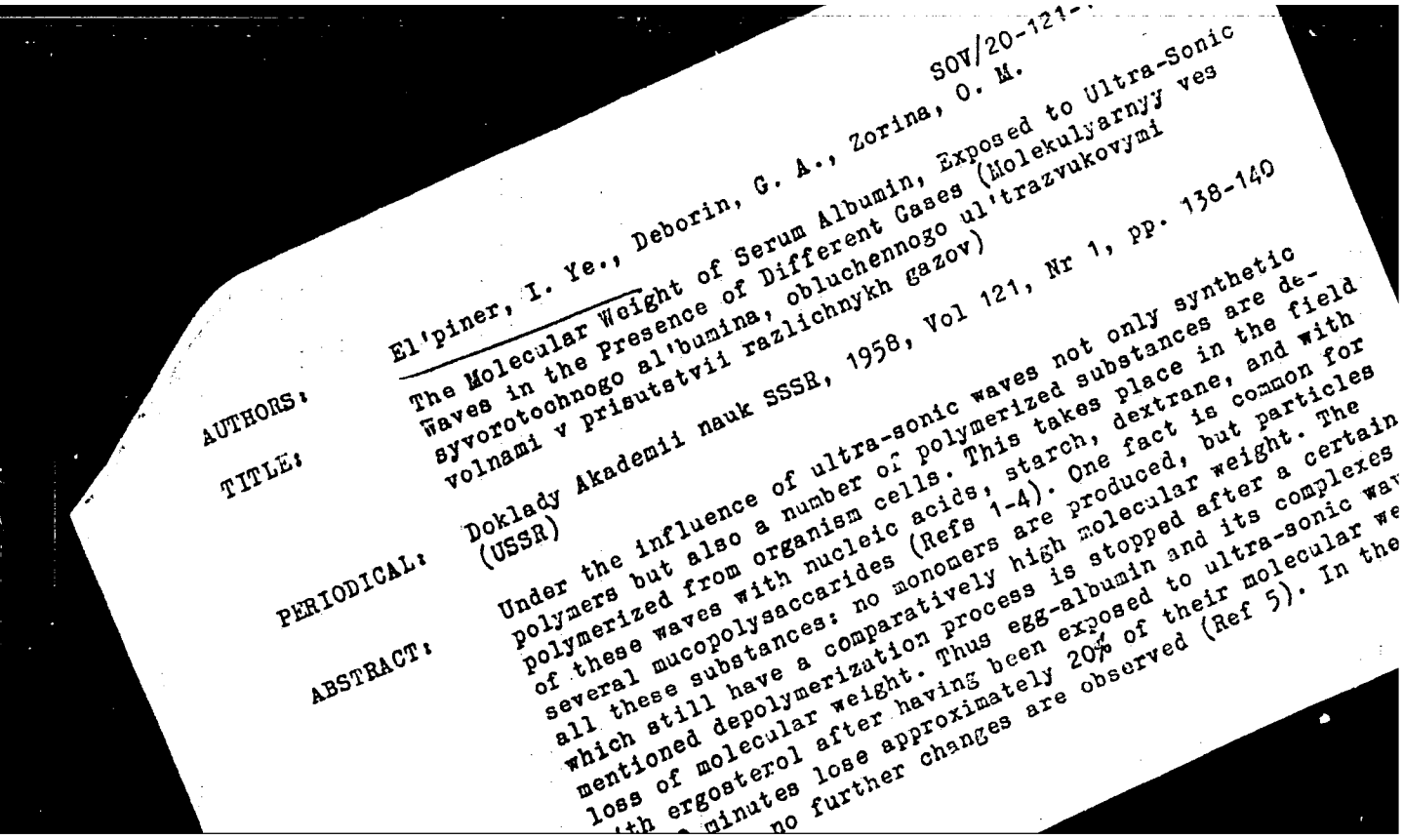
Card 1/3

On the Synthesis of Substances in a Water Saturated With Gases of a Reduction Atmosphere Under the Action of Supersonic Waves

2o-119-6-36/56

presence of oxygen and nitrogen in irradiated water ammonia forms. The water on this occasion was irradiated in glass containers at an intensity of the sound waves of 6 -7 watt per 1 cm^3. The method for the purification of nitrogen from oxygen is discussed. The quantity of the ammonia forming increases with increasing duration of irradiation. The presence of carbon monoxide in the gas mixture nitrogen - hydrogen does not diminish the production of ammonia in the water exposed to sound. Further in water exposed to sound in the presence of N_2,CO and H_2 also HCN forms, and besides forms in water exposed to sound also formaldehyde if in this water hydrogen and carbon monoxide are present. Sound oscillations and supersonic vibrations together with other physical causes (ultraviolet rays, electric discharges and radioactive decay) might also have served as energy sources for the most important substances which serve as materials for the building of living organisms in the initial period of the existence of our planet. There are 2 tables.

Card ~~2/3~~



SOV/20-121-

AUTHORS: El'piner, I. Ye., Deborin, G. A., Zorina, O. M.

TITLE: The Molecular Weight of Serum Albumin, Exposed to Ultra-Sonic Waves in the Presence of Different Gases (Molekulyarnyy ves syvorotochnogo al'bumina, obluchennogo ul'trazvukovymi volnami v prisutstvii razlichnykh gazov)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 1, pp. 138-140 (USSR)

ABSTRACT: Under the influence of ultra-sonic waves not only synthetic polymers but also a number of polymerized substances are depolymerized from organism cells. This takes place in the field of these waves with nucleic acids, starch, dextrane, and with several mucopolysaccarides (Refs 1-4). One fact is common for all these substances: no monomers are produced, but particles which still have a comparatively high molecular weight. The mentioned depolymerization process is stopped after a certain loss of molecular weight. Thus egg-albumin and its complexes with ergosterol after having been exposed to ultra-sonic wav minutes lose approximately 20% of their molecular we no further changes are observed (Ref 5). In the

The Molecular Weight of Serum Albumin, Exposed to Ultra-Sonic Waves in the Presence of Different Gases

The latter do not lose the capacity of forming a monomolecular layer. A fission of the protein molecules was observed also in the case of an acoustic irradiation of serum albumin solutions of higher concentration (Table 2). There is no interaction between the splinters of the protein molecule, they are stable, if the acoustic irradiation takes place in the presence of oxygen (Table 3). The above mentioned investigation makes possible the investigation of the correlation between structure and function of the protein bodies. There are 1 figure, 3 tables, and 9 references, 7 of which are Soviet.

ASSOCIATION: Institut biofiziki Akademii nauk SSSR (Institute of Biophysics, AS USSR) Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry imeni A. N. Bakh, AS USSR)

PRESENTED: March 10, 1958, by A. I. Oparin, Member, Academy of Sciences, USSR

The Molecular Weight of Serum Albumin, Exposed to Ultra-Sonic Waves in the Presence of Different Gases

present paper the same is proved for other proteins (serum albumin). In this case, however, an enlargement of the protein molecules takes place. The character of the changes mainly depends on the nature of the gas with which the protein solution exposed to ultra-sonic waves is saturated. Aqueous solutions of horse albumin recrystallized twice and dried lyophilically, served as experimental object. The solution was poured into the glass tubes in the socalled ultra-sonic fountain (oscillation frequency 740 kilo cycles, sound pressure of waves $\sim$4 watt/cm^2). Table 1 shows the values of the molecular weight of the serum albumin which was exposed to ultra-sonic waves in the presence of air. This shows that the molecular weight is reduced with a longer duration of acoustic irradiation. After 50 minutes the reduction amounts to almost 50%. Such a loss could not be caused by the splitting off of the one or other lateral- or terminal group. In the case of the used intensity forces develop which are sufficient for the breaking of C-C bonds (Ref 7). We may assume that polypeptide bonds are broken here and rather great molecular splinters are formed.

SOV/20-123-4-23/53

17(4)
AUTHORS: El'piner, I. Ye., Sokol'skaya, A. V.

TITLE: The Effect of Ultrasonics on Some Proteins and Amino Acids as Related to the Nature of the Gas Present (Deystviye ul'trazvuka na nekotoryye belki i aminokisloty v zavisimosti ot prirody prisutvuyushchego gaza)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 4, pp 659-662 (USSR)

ABSTRACT: The data found by the authors of the present report show the following: The development of chemical processes in a field of ultrasonic waves is influenced also by inert gases (i.e. by noble gases). Besides, the various noble gases differ from one another in this respect. In the present study argon and helium are used. Investigations were carried out with proteins, amino acids and other organic compounds. The rate of the chemical processes was estimated from the quantity of formaldehyde formed in the aqueous solution of the organic compound subjected to ultrasonic irradiation. As source of the ultrasonic waves a piezoquartz generator was used; the frequency of the ultrasonic waves employed amounted to 380,000 cycles, and the intensity of oscillations was 3-4 watt/cm^2. In the aqueous solutions of several amino acids saturated with

The Effect of Ultrasonics on Some Proteins and Amino Acids as Related to the Nature of the Gas Present

oxygen (glycocoll, alanine, serine, glutamic acid, aspartic acid) formaldehyde is actually produced under the influence of the ultrasonic waves. However, the largest quantity of formaldehyde (about 30-40% more than in the case of saturation with oxygen) is formed in the case of a previous saturation of the solutions with argon. In the case of saturation with helium the velocity of the separation of formaldehyde from the amino acids is hardly accelerated. Similar results are obtained also by the investigation of the formation velocity of formaldehyde in an aqueous solution of keto-glutaric aicd subjected to ultrasonic irradiation as well as egg albumin and serum albumin. The presence of argon intensities the coagulating effect produced by the ultrasonic waves upon the albumin solutions considerably. The results obtained by the experiments carried out indicate the possibility of regulating the course of chemical processes in the solution subjected to ultrasonic irradiation. They also open up new prospects of explaining the mechanism of the chemical and biological effect of ultrasonic waves. There are 2 figures, 1 table, and 8 references, 6 of which are Soviet.

~~Card 2/3~~

O. Yu. Biol Physics AS USSR

EL'PINER, I.Ye.; PYSHKINA, N.I.

Propagation of ultrasonic waves in aqueous solutions of muscle proteins [with summary in English]. Biofizika 4 no.2:129-133 '59. (MIRA 12:4)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(MUSCLE PROTEINS,
aqueous solution, ultrasonic wave velocity (Rus))
(ULTRASONICS,
velocity in aqueous solution of musc. proteins (Rus))

TIKHONENKO, A.S.; EL'PINER, I.Ye.

Electron microscope study of the phagolysate of Bacillus mycoides following exposure to ultrasonic waves. Biofizika 4 no.5:610-614 '59. (MIRA 14:6)

1. Institut biologicheskoy fiziki AN SSSR, Moskva i Laboratoriya elektronnoy mikroscopii AN SSSR, Moskva.
(BACILLUS MYCOIDES) (BACTERIOPHAGE)
(ULTRASONIC WAVES—PHYSIOLOGICAL EFFECT)

SOV/46-5-2-2/34

AUTHOR: El'piner, I. Ye.

TITLE: On the Mechanism of Chemical Effects of Ultrasonic Waves (O mekhanizme khimicheskogo deystviya ul'trazvukovykh voln) Review (Obzor)

PERIODICAL: Akusticheskiy zhurnal, 1959, Vol.5, Nr 2, pp 133-145 (USSR)

ABSTRACT: The author reviews various mechanisms of the effect of ultrasonic waves on chemical processes such as oxidation, reduction, decomposition and synthesis, polymerization and de-polymerization, and internal molecular changes. Although it is generally agreed that cavitation is responsible for the observed chemical effects of ultrasound, there is no agreement about the detailed mechanism. The following theories have been proposed:
(1) Cavitation-mechanical theory, which suggests that chemical bonds are broken by forces arising on collapse of cavitational bubbles (Refs.5-7);
(2) Cavitation-resonance theory - chemical effects are produced by mechanical forces when the natural frequency of pulsations of gaseous bubbles coincides with the frequency of applied ultrasound (Refs.6, 9);

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On the Mechanism of Chemical Effects of Ultrasonic Waves. Review.

(3) Cavitation-photoelectro-chemical theory due to Frenkel' (Refs.13, 14) - large electrical potentials are produced across lens-shaped cavitational bubbles in their first stage producing visible and ultraviolet rays (known as ultrasonic luminescence) which act photochemically.
The reviewer suggests that there are two stages in the chemical action of cavitation. The first stage is that described by Frenkel's theory. During this stage gases diffuse into cavitational bubbles and pressure in them is still low (0.01 - 0.05 atm). Electrical discharges in bubbles produce ionization and activation of enclosed gases. During the second stage the pressure in bubbles increases, they lose their lenticular form and collapse, producing shock waves. These shock waves are strong enough to break valence bonds. The reviewer uses this two-stage scheme as a framework to discuss various chemical processes known to be produced by ultrasonic fields.

On the Mechanism of Chemical Effects of Ultrasonic Waves. Review.

There are 90 references, of which 31 are English, 31 Soviet, 10 French and 18 German.

ASSOCIATION: Institut biofiziki AN SSSR, Moskva (Institute of Biophysics, Ac. Sc. USSR, Moscow)

SUBMITTED: November 17, 1958

BRONSKAYA, L.M.; EL'PINER, I.Ye.

Stimulating action of ultrasonic waves on the germination of corn seeds. Akust.zhur. 5 no.4:492-493 '59. (MIRA 14:6)

1. Institut biofiziki AN SSSR, Moskva.
(Ultrasonic waves) (Corn (Maize))

EL'PINER, I.Ye.; DEBORIN, G.A.; ZORINA, O.M.

Molecular weight and activity of proteolytic enzymes irradiated with ultrasonic waves. Biokhimiiia 24 no.5:817-822 S-O '59. (MIRA 13:2)

1. Institut biologicheskoy fiziki i Institut biokhimii im. A.N. Bakha Akademii nauk SSSR, Moskva.
(PROTEASES chem.)
(ULTRASONICS eff.)

FADEYEVA, N.P.; RAUTENSHTEYN, Ya.I.; EL'PINER, I.Ye.

Effect of ultrasound on certain actinophages and bacteriophages.
Mikrobiologiia 28 no.3:391-396 My-Je '59. (MIRA 13:3)

1. Institut mikrobiologii AN SSSR i Institut biofiziki AN SSSR.
(ULTRASONICS, eff.
on actinophages & bacteriophages (Rus))
(ACTINOMYCES
actinophages, eff. of ultrasonics (Rus))
(BACTERIOPHAGE
actinophages & bacteriophages, eff. of ultrasonics (Rus))

FADEYEVA, N.P.; EL'PINER, I.Ye.

Effect of ultrasonic waves on Azotabacter chroococcum. Mikrobiologiia 28 no.4:488-489 Jl-Ag '59. (MIRA 12:12)

1. Institut biologicheskoy fiziki AN SSSR.
(ULTRASONICS eff.)
(AZOTOVACTER radiation eff.)

~~17(10)~~ 5.2200(c) 66501

AUTHORS: El'piner, I.Ye., Sokol'skaya, A.V. SOV/20-129-1-56/64

TITLE: On the Processes of Oxidation of Iron Ions in a Field of Ultrasonic Waves

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 1, pp 202-204 (USSR)

ABSTRACT: The oxidation processes taking place in an aqueous medium under the influence of ultrasonic waves are probably due to the activation of oxygen and the appearance of a free OH radical which is the product of the cleavage of the water molecule (Refs 1-3). There are reasons for the belief that the activation or ionization of the water molecules and various gases takes place in cavitations which form in the aqueous medium under ultrasonic irradiation. Various inert gases with which the water is saturated are activated in the field of the ultrasonic waves, but not all of them in the same way. Helium suppresses all the oxidation processes investigated by the authors. These differences are liable to open up new ways of studying the elementary processes which are at the root of the phenomenon of oxidation. The authors exposed 0.01 n. solutions of $FeSO_4$ in 1.1 n. H_2SO_4 /

On the Processes of Oxidation of Iron Ions in a Field of Ultrasonic Waves

to the impact of ultrasonic waves. Prior to this treatment these solutions were saturated with oxygen, argon, or helium for one hour. Figure 1 shows the standard curve for the determination of $Fe_2(SO_4)_3$ by means of the spectrophotometer SF-4. Figure 2 contains the results of the determination of the amount of Fe^{2+} ions chemically transformed in the field of ultrasonic waves. Similarly, the concentration of Fe^{3+} ions produced by the said impact is given. It can be seen from this figure that the amount of the "disappeared" Fe^{2+} ions is not equal to that of newly produced Fe^{3+} ions, if the dissolution took place in the presence of oxygen. There is hardly any loss of Fe^{2+} ions to be found in the presence of helium, while there is a considerable loss in the case of argon. In this case there is no divergency between the loss of Fe^{2+} ions and the addition of Fe^{3+} ions as was found in the case of oxygen. Thus the chemical transformation of divalent iron is restricted to the transformation into

trivalent ions, if an argon-saturated solution is treated with ultrasonic waves. This process is probably due to the appearance of the OH radicals formed by the cleavage of water molecules. If the solution is saturated with oxygen, the molecules of the latter participate in the reaction. Here, such iron compounds are formed as cannot be detected by means of the methods for the determination of di- and trivalent iron used in this case. Apparently, these compounds are rather unstable iron peroxides. M.A. Proskurnin and collaborators (Refs 7,8) in this connection develop conceptions regarding the effect of ionizing radiation upon Fe^{2+}. The results cited here may be considered a confirmation of Bakh's peroxide theory in the chemistry of ultrasonic waves. There are 3 figures and 8 references, 6 of which are Soviet.

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR (Institute of Biological Physics of the Academy of Sciences, USSR)

PRESENTED: July 1, 1959, by L.S. Shtern, Academician

Card 3/4

EL'PINER, Isaak Yefimovich

[Ultrasonics in biology] Ul'trazvuk v biologii. Moskva, Znanie, 1960. 39 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.8, Biologiia i meditsina, no.7). (MIRA 13:8)

(ULTRASONIC WAVES) (BIOLOGY)

36727
S/194/62/000/002/056/096
D273/D301

5.4000 2220
24.1800 2320

AUTHORS: El'piner, I. Ye. and Sokol'skaya, A. V.

TITLE: The influence of inert gases on oxidation processes in a field of ultrasonic waves

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 2, 1962, abstract 2-5-25s (V sb. Rol'perekisey i kisloroda v nach. stadiyakh radiobiol. effekta. M., AN SSSR, 1960, 105-115)

TEXT: In the principle of the study of the mechanism of ultrasonic chemical reaction (as also in radiation chemistry) there lies the notion of radiolysis or photolysis of water which stipulate the arising of two interrelated processes, leading to the formation of free radicals OH and H and of molecular substances: H_2O and H_2. In the case of ultrasonic action these processes apparently pass into the gaseous phase -- cavitation voids. However, the study of processes which bring about cavitation voids leads to great experimental difficulties. In this respect, the comparison between ultra-

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The influence of ...

sonic chemical reaction and chemical reactions which take place under the action of vigorous radiations, light energy, or electronic flow, etc. can help. Experimental data are provided which are of interest from the point of view of the study of processes which are akin to the phenomenon of oxidation, caused at determined conditions by the said physical agents. It is found that in a sounded water solution of methylene chloride (CH_2Cl_2) the synthesis of a new compound $C_{10}H_2O_3Cl_2$ is observed. It was also found that in an ultrasonic field some substances oxidize preferentially in the presence of argon and others of acid. Under the action of ultrasound in an argon saturated solution of Mohr's salt (0.01 $NFeSO_4$) the chemical transformation of 2-valent iron is expressed in the transition of the latter into 3-valent ions. Data are presented on the action of ultrasound on albumen and amino-acids in the presence of oxygen and of inert gases. Water solutions of a series of amino-acids saturated with oxygen under the influence of ultrasound produce formaldehyde. It was also discovered that, in the presence of

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D273/D301

The influence of ...

argon, the coagulating action of ultrasound on albumen solutions was considerably increased. An explanation is given of the influence of inert gases on the course of the process of oxidation in an ultrasonic field: Inert gases which are in the cavitation voids, apparently act in different ways on the formation in these voids of radicals, in particular OH radicals, indicating the definite influence on the chemical activity of these and other radicals. 7 figures. 1 table. 16 references. [Abstracter's note: Complete translation.]

Card 3/3

EL'PINER, I.Ye.

"Practical work in general biophysics. No.1: Physicochemical methods in biology" by N.V. Burlakova, O.R. Kol'e, IU.A. Kriger. Reviewed by I.E. El'piner. Nauch.dokl.vys.shkoly; biol.nauki no.2:207 '60. (MIRA 13:4)

(BIOPHYSICS--STUDY AND TEACHING) (BURLAKOVA, N.V.)
(KOL'S, O.R.) (KRIGER, IU.A.)

S/194/61/000/007/047/079
D201/D305

AUTHORS: Losev, B.I., Lidina, N.G. and El'piner, I.Ye.

TITLE: Oxidation of humic acids and mineral coals by ultrasonic waves

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 7, 1961, 14-15, abstract 7 E90 (Tr. In-ta goryuchikh iskopayenykh, AN SSSR, 1960, 14, 147-150)

TEXT: The liquids after being subjected to ultrasound (frequency 380 and 780 kc/s, sound intensity up to 20 W/cm^2) were analyzed by chromotography methods. Experiments were carried out with the humic acid of the brown coal of the Aleksander deposits, with the brown coals of Aleksander, Krivlev and Babayev deposits, with highly weathered coals of the Chertinsk and Tom'-Usinsk beds, together with the low-acidity coal of the Nikolayev formation. No effects of ultrasound has been observed with the low-acidity Nikolayev formation coal. In all other experiments the results agree as follows:

Card 1/2

S/194/61/000/007/047/079
D201/D305

Oxidation of humic acids...

With ultrasounds applied to an alkaline liquid, formic and acetic acids may be obtained: With aqueous solutions humic acids undergo peptization and only the second application of ultrasound to the filtrate produces the formic and acetic acids as well. 14 references. [Abstracter's note: Complete translation]

Card 2/2

EL'PINER, I.Ye.; PYSHKINA, N.I.

Effect of ultrasonic waves on aqueous solutions of sodium carboxymethylcellulose. Vysokom. soed. 2 no.2:243-246 F '60. (MIRA 13:11)

1. Institut biologicheskoy fiziki AN SSSR.
(Ultrasonic waves) (Cellulose)

15.8107 2109,2205

84518
S/190/60/002/004/020/020
B004/B056

AUTHORS: El'piner, I. Ye., Pyshkina, N. I.

TITLE: The Effect of Ultrasonics Upon Synthetic Polymers (Anid P-669 (G-669))

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 4, pp. 607 - 613

TEXT: The authors investigated the mixed polymer anid P-669 (G-669), which is soluble in ethanol, a polycondensation product of hexamethylendiamine with adipinic acid, azelaic acid, and caprolactam in the ratio of 1 : 1 : 2. Acoustic irradiation was carried out in a closed vessel at 740 kc/sec and an intensity of 15 w/cm^2. The piezo quartz lamella was fitted to the bottom of the vessel (Fig. 1). Before and after acoustic irradiation, the intrinsic viscosity, the molecular weight, and the propagation rate of ultrasonics was determined. For the purpose of determining the propagation rate of ultrasonics, a somewhat modified interferometer according to T. S. Velichkina, I. L. Fabelinskiy (Ref. 10),

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The Effect of Ultrasonics Upon Synthetic Polymers (Anid Г-669 (G-669))

was used, the wiring scheme of which with standard signal generator type ГСС-6 (GSS-6) is shown in Fig. 2, whereas the measuring chamber of the interferometer, in which the thickness of the liquid layer was exactly adjustable to 5μ, is shown in Fig. 3. The anid G-669 was dissolved in alcohol or in a mixture of alcohol and water, and was acoustically irradiated in the presence of air, hydrogen, helium or argon for 1 to 3 hours. In anid, dissolved in pure alcohol, neither a change in intrinsic viscosity, nor in the molecular weight and sound velocity occurred. When dissolved in water + alcohol = 1 : 3, anid, in the presence of hydrogen, showed a decrease of intrinsic viscosity, which did not occur in the presence of other gases (Table). Besides, the molecular weight in the presence of hydrogen increases to the 3- to 4-fold (Fig. 4), and the velocity of sound decreases. Thus, a ramification of the molecule is caused, which was confirmed by the change in the compressibility of the molecule, calculated according to the equation by Hazime Shiio (Refs. 13, 14) (Table 2). The compressibility increased from $3.3 \cdot 10^{-12}$/bar to 15.10^{-12}/bar. The ramification of the molecule is

84518

The Effect of Ultrasonics Upon Synthetic Polymers (Anid P-669 (G-669))

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B004/B056

explained by the authors by polycondensation on the lateral bonds, which is caused by activated hydrogen and by hydrogen molecules. The authors mention a paper by S. R. Rafikov, S. A. Pavlova, and B. L. Tseitlin (Ref. 12). There are 4 figures, 2 tables, and 14 references: 9 Soviet, 2 US, 1 French, and 2 German.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR (Institute of Biological Physics of the AS USSR)

SUBMITTED: January 21, 1960

Card 3/3

EL'PINER, I.Ye.; SOKOL'SKAYA, A.V.

Oxidation processes of biologically-active substances in a field of ultraviolet waves. Biofizika 5 no.1:21-27 '60. (MIRA 13:6)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(ULTRAVIOLET RAYS eff.)
(OXIDATION REDUCTION radiation eff.)

EL'PINER, I.Ye.; DRIZE, I.M.; FAYKIN, I.M.

Ultrasonic images of organs and tissues of the animal organism.
Biofizika 5 no. 2:242-243 '60. (MIRA 14:4)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(ULTRASONIC WAVES) (PHYSIOLOGICAL APPARATUS)

EL'PINER, I.Ye.; ZORINA, O.M.

Effect of ultrasonic waves on ribonucleaase. Biofizika 5 no. 5:573-576 '60. (MIRA 13:10)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(RIBONUCLEASE) (ULTRASONIC WAVES—PHYSIOLOGICAL EFFECT)

EL'PINER, I.Ye.

Ultrasonic luminescence; a survey. Akust.zhur. 6 no.1:3-15 '60.
(MIRA 14:5)

1. Institut biofiziki AN SSSR, Moskva.
(Luminescence) (Ultrasonic waves)

SOKOL'SKAYA, A.V., EL'PINER, I.Ye.

Fixation of molecular nitrogen under the influecne of ultrasonic waves with the formation of biologically important substances. Akust. zhur. 6 no.2:263-264 '60. (MIRA 13:8)

1. Institut biofiziki AN SSSR, Moskva.
(Nitrogen--Fixation) (Ultrasonic waves)

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S/046/60/006/003/012/012
B006/B063

24.1800

AUTHOR: El'piner, I. Ye.

TITLE: The Action of Ultrasonic Waves on Biomacromolecules

PERIODICAL: Akusticheskiy zhurnal, 1960, Vol. 6, No. 3, pp. 399-408

TEXT: The present article is, for the major part, devoted to investigations of other authors on the above-mentioned subject and to a discussion of their results. The depolymerizing effect of ultrasonic waves is described in detail, and the influence of various gases (oxygen, hydrogen) in the medium surrounding the preparation is studied. In the presence of oxygen, for instance, albumin molecules decompose into small particles under the action of ultrasonic waves, whereas in the presence of hydrogen an aggregation occurs, which manifests itself in a rising molecular weight. The molecular weight of trypsin, for example, is reduced by one-fifth when being treated with ultrasonic waves in an oxygen-containing solution. In a hydrogen-containing solution, however, its molecular weight increases by 30 per cent. In the former case, its ability to ferment is also reduced by 75 - 85 per cent, whereas it remains unaffected in the latter case. The

The Action of Ultrasonic Waves on Biomacromolecules S/046/60/006/003/012/012
B006/B063

fermentation of pepsin and trypsin is reduced by the decomposition of cyclic amino radicals, which is known to be promoted by oxygen. Fig. 3 shows the dependence of the optical density on the kind of gas in which the ultrasonic treatment (duration of 30 min) took place. Helium and hydrogen have no effect on the optical density. It is shown that details of the molecular structure can be determined by examining the effects of ultrasonic waves. Similar rules were also detected in other biopolymers. Desoxyribonucleic acid, whose structure is thoroughly described in this article, was studied in particular. Depolymerization occurs under the action of ultrasonic waves, the fragments still have molecular weights of 3.10^5 (initial weight: $7-9.10^6$), and their size does not depend on the presence of gases. Mention is made of M. A. Khenokh, T. S. Velichkina, I. L. Fabelinskiy, and Dvorkin. There are 5 figures and 30 references: 8 Soviet, 3 US, 9 German, 3 British, and 1 French.

ASSOCIATION: Institut biofiziki AN SSSR Moskva
(Institute of Biophysics of the AS USSR, Moscow)

SUBMITTED: May 7, 1960

Card 2/2

FADEEVA, N.P. [Fadeyeva, N.P.]; RAUTENSTEIN, I.I. [Rautenshteyn, Ya. I.]; EL'PINER, I.E. [El'piner, I. Ye.]

Influence of ultrasonics on some actinophages and bacteriophages. Analele biol 14 no.1:39-45 Ja-Mr '60.

5.3830(A)

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67812

AUTHOR: El'piner, I.Ye. S/074/60/029/01/001/005
B008/B006

TITLE: On the Chemical Effect of Ultrasonic Waves on Macromolecules

PERIODICAL: Uspekhi khimii, 1960, Vol 29, Nr 1, pp 3-22 (USSR)

ABSTRACT: A survey is given of the principal theories dealing with the chemical effect of ultrasonic waves on macromolecules. General problems concerning the mechanism of the chemical effect of ultrasonics were discussed in detail in reference 6. Many scientists assume the chemical effect of ultrasonic waves to be caused by cavitation phenomena. The latter occur in liquids exposed to ultrasonic waves. The theory referred to is the cavitation-mechanical theory (Refs 7-12). According to other authors (Refs 13,14), these chemical processes may be caused by mechanical forces produced by the resonance of the pulsation frequency of the gas bubbles in the liquid with the frequency of the ultrasonic waves. This hypothesis is known as the cavitation-resonance theory. Data on the thermal character of the ultrasonic chemical processes are in agreement with this theory (Refs 15,16). Finally the widely accepted cavitation-photoelectrochemical theory, based on investigations

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by Ya.I.Frenkel' (Ref 17), is discussed. To a certain extent, this theory helped to solve the problem of the nature of the primary products causing one or the other chemical ultrasonic reaction (Refs 18-30). Whether electric potentials in spaces caused by cavitation occur not only in aqueous media, but also in organic, particularly in nonpolar, solvents is as yet unclear. This problem is of great interest, since depolymerization- and polymerization processes of macromolecules under the influence of ultrasonic waves occur in organic (polar and nonpolar) solvents as well as in water. Understandably, those conceptions are prevalent, which assume the mechanical forces connected with the propagation of the acoustic energy in the medium to be the sole cause of depolymerization. On the basis of published material (Refs 31-67), the depolymerizing effect of ultrasonic waves and the cavitation phenomena are discussed. Homogenization of high-molecular compounds, formation of macroradicals and their recombination in the ultrasonic field are described with reference to the data given in references 1, 2, 5, 38, 49, 59, 60, 62, 68-87. Examples illustrating the formation of copolymers under the effect of ultrasonic

waves, and their effect on the rate of polymerization are given ($R_e$fs 88-102). From the papers mentioned it is evident that the modern mechano-chemistry must be supplemented by a new type of energy, i.e., the ultrasonic energy. The latter can cause practically all the reactions observed in this field. The present paper gives a good demonstration of the part played by various factors (character of the solvent and the gas applied, physical parameters of high-polymer molecules, their concentration, etc) in the process induced by ultrasonic waves. In mechano-chemistry, this process is termed "destruction-combination". Further investigations in the field of high-polymer ultrasonic reactions are promising, not only for finding new laws in the chemistry of macromolecules, but also with respect to a wider scientific and practical application of these reactions. The following Soviet scientists are mentioned: V.A.Kargin, T.I.Sogolova, G.A.Slonimskiy, N.K.Baramboym, A.A. Berlin, and B.S.El'tsefon. There are 4 figures, 6 tables, and 102 references, 31 of which are Soviet.

ASSOCIATION: In-t biologicheskoy fiziki AN SSSR (Institute of Biological Physics, AS USSR)

FADEYEVA, N.P.; RAUTENSHTEYN, Ya.I.; EL'PINER, I.Ye.

Adsorption of actinophages by actinomycetes susceptible to them.
Mikrobiologiia 29 no.3:388-394 My-Je '60. (MIRA 13:7)

1. Institut mikrobiologii AN SSSR i Institut biofiziki AN SSSR.
(ACTINOMYCES) (BACTERIOPHAGE)

ROZENBERG, L.D., doktor tekhn.nauk; EL'PINER, I.Ye., doktor biol.nauk

Ultrasound in medicine. Priroda 49 no.10:35-41 O '60.(MIRA 13:10)
(Ultrasonic waves)

EL'PINER, I.Ye.; SOKOL'SKAYA, A.V.

Amino acid synthesis in aqueous solutions of organic compounds saturated with molecular nitrogen due to the effect of ultrasonic waves. Dokl.AN SSSR 133 no.5:1227-1230 Ag '60. (MIRA 13:8)

1. Institut biologicheskoy fiziki Akademii nauk SSSR. Predstavleno akad. A.I. Oparinym.
(Amino acids) (Ultrasonic waves)

DVORKIN, G.A.; EL'PINER, I.Ye.

Physicochemical modifications of desoxyribonucleic acid caused by ultrasonic waves. Dokl. AN SSSR 134 no.3:702-705 S '60.(MIRA 13:9)

1. Institut biologicheskoy fiziki Akademii nauk SSSR. Predstavleno akademikom L.S. Shtern.
(DESOXYRIBONUCLEIC ACID) (ULTRASONIC WAVES)

EL'PINER, I.Ye.; ZORINA, O.M.

Peroxide radicals of protein formed by the action of ultrasonic waves. Dokl. AN SSSR 134 no.6:1472-1474 O '60. (MIRA 13:10)

1. Institut biologicheskoy fiziki Akademii nauk SSSR. Predstavleno akademikom A.I.Oparinym.

(ULTRASONIC WAVES--PHYSIOLOGICAL EFFECT)
(PROTEINS) (RADICALS (CHEMISTRY))

ELPINER, I. Ye., SOKOLSKAYA, A. V. (USSR)

"Synthesis of Amino Acids under the Influence of Ultrasonic Waves."

Report presented to the 5th International Biochemical Congress, Moscow, 10-16 August 1961

ELPINER I. Ye, ZORINA O,M. (USSR)

"Physicochemical Ch nges and the Activities of Enzymes Exposed to Ultrasound."

Report presented at the 5th Int'l Biochemistry Congress, Moscow, 10-16 Aug. 1961

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041212(

EL'PINER, I.Ye.

Ultrasonic waves and some problems of modern biology. Izv. AN SSSR Ser. biol. no.3:412-424 My-Je '61. (MIRA 14:5)

1. Institute of Biological Physics, Academy of Sciences of the U.S.S.R., Moscow.
(ULTRASONIC WAVES—PHYSIOLOGICAL EFFECT)

OVCHINNIKOV, N.M.; EL'PINER, I.Ye.; REZNIKOVA, L.S.; SUPRUN, Ye.T.

Sound-treated antigens in the serodiagnosis of syphilis and gonorrhea. Lab.delo 7 no.7[illegible]38-41 Jl '61. (MIRA 14:6)

1. Mikrobiologicheskiy otdel (zav. - prof. N.M.Ovchinnikov) TSentral'nogo nauchno-issledovatel'skogo kozhno-venerologicheskogo instituta i laboratorii ul'trazvuka (zav. - prof. I.Ye.El'piner) instituta biofiziki AN SSSR, Moskva.
(ANTIGENS AND ANTIBODIES) (SYPHILIS)
(GONORRHEA)

RAUTENSHTEYN, Ya. I.; FADEYEVA, N. P.; EL'PINER, I. Ye.

Possibility of obtaining nonlysogenic variants from lysogenic cultures of actinomycetes using ultrasonics. Mikrobiologiia 30 no.3:441-446 My-Je '61. (MIRA 15:7)

1. Institut mikrobiologii AN SSSR i Institut biofiziki, AN SSSR, Moskva.

(ULTRASONIC WAVES—PHYSIOLOGICAL EFFECT)
(ACTINOMYCES)

27.1220

39621
S/194/62/000/004/052/105
D295/D308

AUTHORS: Fadeyeva, N. P., El'piner, I. Ye. and Rautenshteyn, Ya. I.

TITLE: The influence of ultrasonic waves on the development of actinomycetes

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 4, 1962, abstract 4-5-37a (Mikrobiologiya, 30, no. 5, 1961, 849-854)

TEXT: The results are given of a study of the stability of spores of actinomycetes under the influence of ultrasonic waves on the rate of growth of spores of sound irradiation. 1. Act. olivaceus No. 132 spores are comparatively stable under the action of ultrasound of 20 W/cm^2 intensity at a frequency of 650 kc/s; a noticeable decrease of the growth of spores occurs after they have been irradiated in the dark for 10 - 20 min. 2. Irradiated spores grow more slowly in comparison with non-irradiated ones, 3. In cultures grown out of irradiated spores or fragments of mycelium, in the

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first 24 hours' growth, the occurrence of mycelium with a large number of thickened lateral shoots is observed, which was never observed in control experiments. 4. Cultures grown out of irradiated spores or mycelium fragments differ from control cultures by a higher accumulation of biomass and for a more delayed passage to autolysis. [Abstracter's note: Complete translation.]

EL'PINER, I.Ye.; SOKOL'SKAYA, A.V.

Inert gases and amino acid synthesis in the field of ultrasonic waves. Dokl. AN SSSR 140 no.2:496-498 S '61. (MIRA 14:9)

1. Institut biologicheskoy fiziki AN SSSR. Predstavleno akademikom A.I.Oparinym.
(Amino acids) (Ultrasonic waves) (Argon)

EL'PINER, I.Ye.; STEKOL'NIKOV, L.I.

Effect of ultrasonic waves on alkaloids. Dokl. AN SSSR 141 no.1:219-222 N '61. (MIRA 14:11)

1. Institut biologicheskoy fiziki AN SSSR. Predstavleno akademikom L.S. Shtern.
(Alkaloids)
(Ultrasonic waves)

L 5274-66 EWT(1)/FS(v)-3 DD/GS

ACC NR: AT6000312 SOURCE CODE: UR/0000/64/000/000/0003/0180

EDITOR: El'piner, I. Ye. (Doctor of biological sciences)

ORG: none

TITLE: Ultrasound in biology; bibliography of Soviet and foreign literature for 1950-1962

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Biblioteka. Ul'trazvuk v biologii; bibliografiya otechestvennoy i inostrannoy literatury za 1950-1962

TOPIC TAGS: ultrasonics, ultrasonic effect, acoustic biologic effect

ABSTRACT: This comprehensive bibliography on the biological aspects of ultrasound has an appendix listing the 134 Soviet journals and 578 non-Soviet sources from which it was compiled. Another useful tool is the author index, which permits evaluation of individual contributions to the literature of ultrasound. The Soviet scientist El'piner, for example, is represented in this work by 89 items (some co-authored). However, it must be noted that only twenty-five percent of the total listings are Soviet.

The bibliography begins with a two-chapter general section, which includes bibliographies, materials of congresses and conferences, general

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works, and sources dealing with equipment and methods of dosimetry. Chapter Three is devoted to ultrasonic methods of investigation in biology, with references on acoustical parameters and ultrasonic visualization of organs and tissues. Ultrasound in histology is also treated. Only non-Soviet sources are listed under the headings Ultrasonic cardiography, Echo-encephalography, and Ultrasonic determination of blood flow.

Chapter Four, entitled Biological effect of ultrasound, is the most important part of the bibliography. This chapter treats exhaustively the effect of ultrasound on a variety of biological and biochemical objects (biological macromolecules, carbohydrates and lipids, organic compounds, and pharmacological substances, to name only a few). Sections are devoted to the influence of ultrasound on heredity and the cell, and on various microorganisms. The effect of ultrasound on plants, invertebrates, and vertebrates is considered in detail. There are separate groupings for individual human organs. In all, 397 Soviet sources and 1353 non-Soviet sources are listed in this chapter.

Chapter Five deals with ultrasonic signaling in animals (bats, porpoises, etc.) and animal perception of ultrasound. It should be noted that use of multiple listings makes for some duplication, which is not reflected in the counts given; thus, each subheading includes all pertinent works.

[FSB: v. 1, no. 10]

SUB CODE: OP, LS/ SUBM DATE: none

Card 2/2

EL'PINER, I.Ye.; STEKOL'NIKOV, L.I.

Physiochemical properties and hormonal activity of insulin exposed to the action of ultrasonic waves. Dokl. AN SSSR 146 no.3:700-703 S '62. (MIRA 15:10)

1. Institut biologicheskoy fiziki AN SSSR. Predstavleno akademikom L.S.Shtern.
(INSULIN) (ULTRASONIC WAVES—PHYSIOLOGICAL EFFECT)

EL'PINER, I.Ye.; STEKOL'NIKOV, L.I.

Selective effect of ultrasonic waves on the molecular structure of insulin. Dokl. AN SSSR 146 no.4:929-932 O '62. (MIRA 15:11)

1. Institut biologicheskoy fiziki AN SSSR. Predstavleno akademikom A.I. Oparinym.

(ULTRASONIC WAVES--PHYSIOLOGICAL EFFECT)
(INSULIN)

EL'PINER, I.Ye.; SOKOL'SKAYA, A.V.

Chemical transformations of dipeptides and tripeptides under the action of ultrasonic waves in the presence of active and inert gases. Dokl. AN SSSR 147 no.5:1220-1222 D '62. (MIRA 16:2)

1. Institut biologicheskoy fiziki AN SSSR. Predstavleno akademikom A.I. Oparinym.
(PEPTIDES) (ULTRASONIC WAVES)

PHASE I BOOK EXPLOITATION SOV/6516

El'piner, Isaak Yefimovich

Ul'trazvuk; fiziko-khimicheskoye i biologicheskoye deystviye (Ultrasonics; Physical, Chemical and Biological Action). Moscow, Fizmatgiz, 1963. 420 p. 9000 copies printed.

Eds.: L. P. Kayushin and N. A. Rayskaya; Tech. Ed.: L. Yu. Plakshe.

PURPOSE: This book is intended for specialists in biophysics, chemistry, biochemistry, and acoustics.

COVERAGE: Experimental data on the specific effects (chemical and biological) of ultrasonic waves are discussed. Applications of ultrasonic methods in chemistry and biology, and fundamental problems in cell physiology and chemistry are considered. The following personalities are mentioned: professors G. L. Slonimskiy, G. M. Frank, L. D. Bergel'son, R. Kh. Fregdlina, L. D. Rozenberg, and S. Ya. Zalkind. There are 1108 references

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S/026/63/000/001/005/007
A004/A126

AUTHORS: El'piner, I. Ye., Doctor of Biological Science, Stekol'nikov, L. I. (Moscow)

TITLE: Insulin and ultrasonics

PERIODICAL: Priroda, no. 1, 1963, 100 - 101

TEXT: The authors report on the results of tests carried out at the Laboratory of Ultrasonic Biophysics of the Institute of Biophysics of the Academy of Sciences USSR to study the structure and hormonal action of insulin subjected to ultrasound in the presence of various gases, such as oxygen, argon or hydrogen. It was found that, as a result of ultrasonic treatment - the ultrasonic wave frequency was 800 kc, the intensity 10 - 12 w/cm^2 of emitting surface - of an insulin solution in the presence of oxygen, histidine was detected in the B-end of the insulin molecule instead of phenylalanyl. The authors describe the molecule reaction to ultrasonic treatment, present the arrangement scheme of amino acid residues in the insulin molecule and report on the transformation of asparagine into aspartic acid (deamidation process), which was detected by them

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Insulin and ultrasonics

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A004/A126

in subjecting asparagine in an aqueous solution to ultrasound. Analogous data were obtained in studying the biological activity by another method, i.e. the authors refer to the property of insulin to reduce the blood sugar level and prove that the hyperglycemia effect is caused by small peptides, or by the products of their chemical transformation, which appear in the insulin solution subjected to ultrasound in the presence of oxygen.

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EL'PINER, I.Ye.; SHEBALDINA, A.D.

Photodynamic effect of dyes on yeast cells subjected to the action of ultrasonic waves. Radiobiologiia 3 no.5:646-650 '63. (MIRA 17:4)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.